

Introduction - General Measurement System

ME3023 - Measurements in Mechanical Systems

May 29, 2020

Topic 1 - General Measurement System

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- Welcome Back!
- Definition of a Measurement
- Measurement System Stages
- Examples in Mechanical Engineering

Welcome to New Video Topics

Welcome Back!

- Things are going to be different but we will still learn!
- These new outlines should help keep me/us on track.
- The material will be organized in ~ 10 min videos, and you can watch them at anytime.

Definition of a Measurement

“A **measurement** is an act of assigning a specific value to a physical variable.”

Text: Theory and Design of Mech. Meas.

Measurement System Stages

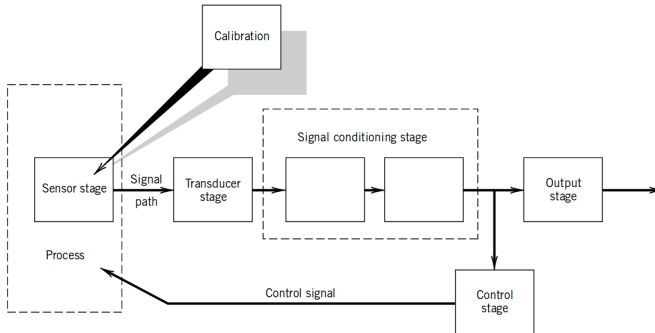


Figure 1.5 Components of a general measurement system.

Image: Theory and Design of Mech. Meas.

Sensor-Transducer Stage

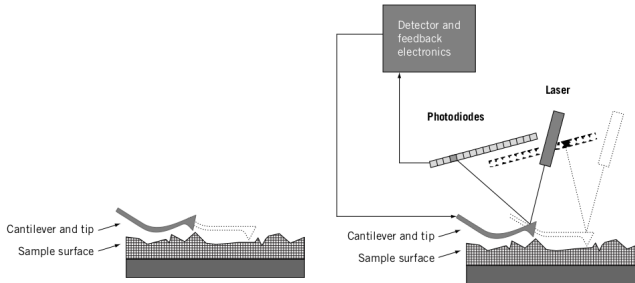
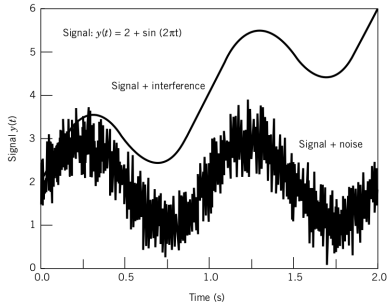


Image: Theory and Design of Mech. Meas.

Signal Conditioning Stage

What is the the definition of signal?



- Filtering
- Amplification
- Attenuation
- Excitation
- Linearization
- Electrical Isolation
- Surge Protection

Image: Theory and Design of Mech. Meas.

Output Stage

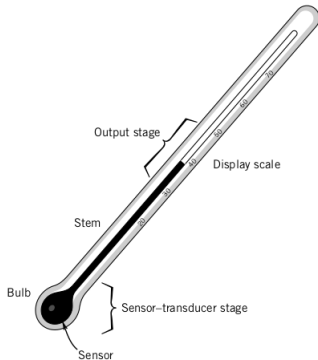


Image: Theory and Design of Mech. Meas.



Image: Wikipedia

Engineering Example

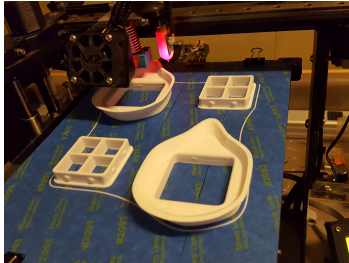
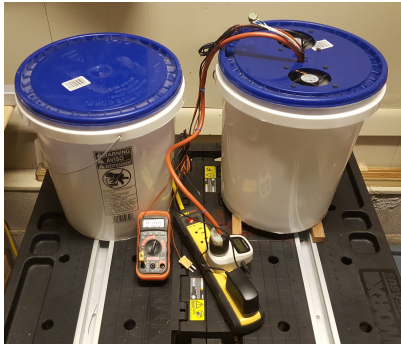


Image: T.Hill

3D printers (FDM) use PLA, ABS, PETG and other plastics which absorb moisture from the air over time causing adverse effects on part quality. This is particularly a problem in humid climates such as the southeastern USA.

Engineering Example



Fortunately the *water-logged* plastic can be dyhydrated for further use.

Inspect the DIY filament dryer shown and Identify each of the following mesurement stages.

- Sensor - Transducer
- Signal Conditionng
- Output
- Feedback Control